THE CLAIMS

I claim:

1. A laser, comprising:

a first optically reflective element;

a second optically reflective element opposed to and aligned with said first optically reflective element to define a laser cavity having an optical axis;

a laser dye gain element having a laser dye and which is interposed between said first and second optically reflective elements along said optical axis for transforming an optical pump signal into a resonant optical signal;

a laser diode system for generating and injecting said optical pump signal into said laser cavity along said optical axis, where said optical pump signal is a sequence of optical pulses having a duration of about $n\tau_f$, where τ_f represents a flourescence lifetime of said laser dye, and $3 \leq n \leq 25$.

2. The laser of claim 1 wherein said optical pump signal has a pulse period in the range of about 1 Khz to 1 Mhz.

3. The laser of claim 1 wherein said laser dye gain element includes a host material selected from the group that includes porous glass, plastic, and sol-gels.

4. The laser of claim 3 wherein said plastic consists essentially of modified polymethyl methacrylate.

5. The laser of claim 1 wherein said first optically reflective element has a curved reflective surface.

6. The laser of claim 5 wherein said first and second optically reflective elements define a nearly hemispherical resonator.

7. A method for generating a laser output signal, comprising the steps of:

generating an optical pump signal that is a sequence optical pulses each having a duration of about $n\tau_f$, where τ_f represents a flourescence lifetime of a laser dye and $3 \leq n \leq 25$;

directing said optical pump signal into an optical resonant cavity having a laser dye gain element that contains said laser dye for transforming said optical pump signal into an excited optical signal;

resonating said excited optical signal in said optical resonant cavity; and

emitting a portion of said excited optical signal from said optical resonant cavity.

8. The method of claim 7 wherein said optical pump signal has a pulse period in the range of about 1 Khz to 1 Mhz.

9. The method of claim 7 wherein said laser dye gain element includes a host material selected from the group that includes porous glass, plastic, and sol-gels.

11. The method of claim 9 wherein said plastic consists essentially of modified polymethyl methacrylate.

12. The method of claim 7 wherein said optical resonant cavity is a nearly hemispherical resonator.